Michigan Educational Assessment Program

RELEASED ITEMS

MATHEMATICS
GRADE 6

Fall 2007

MICHIGAN STATE BOARD OF EDUCATION
STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW

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PART 1

DIRECTIONS

This test has three parts. You may **NOT** use a calculator on the first part. You may use open space in this test booklet for scratch paper. No additional sheets may be used.

There are two types of items on this test: multiple-choice and open-ended.

1. Multiple-choice items will require you to choose the best answer from among four answer choices. For these items, use only a No. 2 pencil to mark your answer in your **Answer Document**. If you erase an answer, be sure to erase it completely. If you skip an item, be sure to mark the answer to the next item in the correct place in your **Answer Document**.

2. Two open-ended items will be found in your test booklet and require you to write, explain, or show your work. For these items, show all of your work neatly and clearly in the space provided in your **Answer Document**.

Sample Multiple-Choice Item:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the *least* number of cases that Marty will need to hold all his CDs?

A 8

B 9

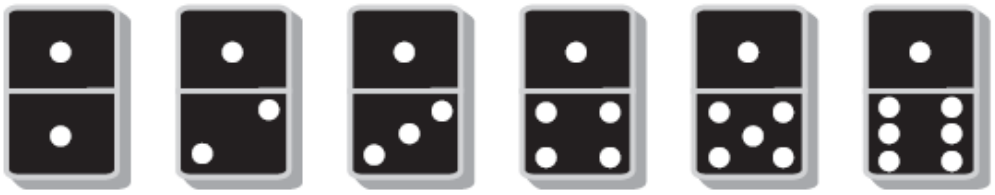
C 10

D 11

For this sample item, the correct answer is **C**. Circle **C** is filled in on the sample item in your **Answer Document**.

Sample Open-Ended Item:

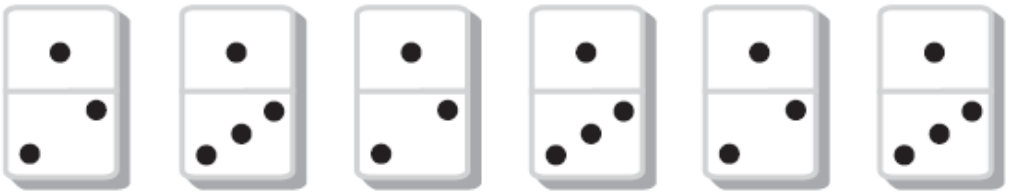
Solve the following problem.



A What pattern do these dominoes display?

They all have one on top. At the bottom it starts with one and keeps adding one until it reaches six.

B Draw another domino pattern different from the one above.



C Describe the pattern you drew.

On the first, third, and fifth dominoes, I drew one on top and two on bottom. On the second, fourth, and sixth, I put one on top and three on the bottom.

For this sample item, you would answer Part A by explaining that they all have one on top. At the bottom it starts with one and keeps adding one on each consecutive domino. For Part B, you would draw a different domino pattern than the one above. Remember to show your work. For Part C, you would explain or describe the pattern you drew.

You will have at least 30 minutes to finish Part 1 of this test. You will be given additional time if necessary.

1. Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page.
2. If you finish early, you may check your work in Part 1 of the test **ONLY**. Do **NOT** look at items in other parts of the test.

If you do not understand any of these directions, please raise your hand.

1 Multiply 105×23

A 2,415

B 2,305

C 525

D 128

2 Multiply a multi-digit number by a two-digit number

A multiplication error

B multiplication error

C correct

D multiplication error

3 Multiply $3,247 \times 16$

A 22,729

B 40,612

C 51,952

D 53,493

4 Divide up to a 4-digit number by a two-digit number

A division error

B correct

C division error

D division error

5 There were 1,139 tomato plants packed in 17 boxes. Each box had an equal number of tomato plants. How many tomato plants were in each box?

A 67

B 69

C 598

D 670

6 Divide up to a 4-digit number by a two-digit number

A correct quotient, incorrect remainder

B correct

C incorrect quotient, incorrect remainder

D incorrect quotient, incorrect remainder

7 Which is true?

A 0.8 is equal to 0.80

B 0.80 is ten times greater than 0.8

C 0.8 is ten times greater than 0.80

D 0.80 is eight times greater than 0.8

8 Understand the relative magnitude in base-10 system

A correct

B incorrect relative magnitude

C incorrect relative magnitude

D moving one place right of decimal means times 10

9 Which of the following is a true statement?

A 0.003 is $\frac{1}{3}$ the value of 0.03

B 0.003 is 3 times the value of 0.03

C 0.003 is $\frac{1}{10}$ the value of 0.03

D 0.003 is 10 times the value of 0.03

10 Convert measurements within a given system

A incorrect conversion

B correct

C did not convert measurement

D inappropriately divided two given numbers

11 How many yards are equivalent to 612 inches?

(1 yard = 36 inches)

A 36

B 17

C 16.5

D 5.9

12 Convert measurements within a given system

A correct

B incorrect metric conversion, decimal 2 places too far right

C same face value for different unit of measure

D multiplied instead of divided

PART 2

DIRECTIONS

You will now begin Part 2 of this test. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional sheets may be used.

If you finish early, you may check your work for Part 2 **ONLY**.

Do **NOT** look at items in other parts of this test.

You will have at least 50 minutes to finish Part 2 of this test.

13 Which of the following statements would be the *best* explanation Amanda could give her brother of what division means?

A Division is the opposite of subtraction.

B Division is repeated subtraction.

C Division is repeated addition.

D Division is the opposite of addition.

14 Understand the meaning of division of whole numbers

A correct

B incomplete, did not include remainder

C incorrect division

D incorrect division

15 A travel club with 32 members wants to rent vans for the spring trip. Each van seats a maximum of 7 people. What is the *least* number of vans the travel club must rent so that each member has a seat?

A 4

B 5

C 25

D 39

16 Know division of whole numbers in form a = bq + r

A correct

B correct equation but does not check solution

C incorrect equation

D incorrect equation

17 Which of the following shows why 27 ÷ 2 = 13 R1?

A $1 \times 13 - 2 = 11$

B $2 \times 13 + 1 = 27$

C $2 \times 1 + 13 = 15$

D $2 \times 13 - 1 = 25$

18 Know division of whole numbers in form a = bq + r

A correct equation but does not check solution

B correct

C correct equation but does not check solution

D correct equation but does not check solution

19 Emma had 80 cherries. She put an equal number of cherries into each of 5 bowls. How many cherries did she put in each bowl?

A 16

B 30

C 85

D 400

20 Solve problems involving x and ÷ of whole numbers

A subtracted instead of multiplied

B added instead of multiplied

C incorrect multiplication

D correct

21 Each of 5 dance classes has 7 members. A sixth dance class has 6 members. What is the total number of members in the 6 dance classes?

A 24

B 35

C 41

D 71

22 Show relationships between areas of polygons

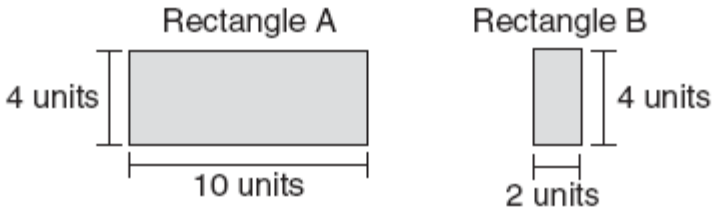
A area of triangle is 1/5 area of rectangle with same height

B correct

C area of triangle is same as rectangle with same height

D area of triangle is twice area of rectangle w/ same height

23 Which statement is true about the relationship between the areas of these two rectangles?



A Rectangle A has twice the area of Rectangle B.

B Rectangle A has five times the area of Rectangle B.

C Rectangle A has one-half the area of Rectangle B.

D Rectangle A has one-fifth the area of Rectangle B.

24 Show relationships between areas of polygons

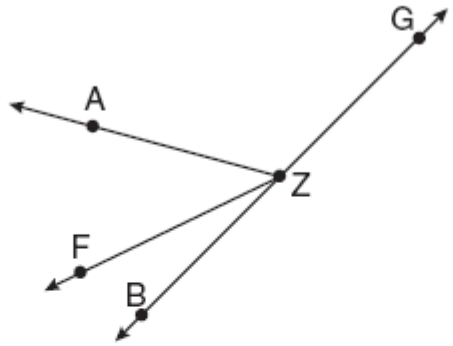
A hypotenuse of triangle was not diagonal of rectangle

B hypotenuse of triangle was not diagonal of rectangle

C triangle covered less than half of grid

D correct

25 Antonia is using her protractor to measure the angles in the diagram shown below.



Which angle in the diagram appears to be a straight angle?

A ∠BZF

B ∠BZG

C ∠AZG

D ∠AZB

26 Measure angles with a protractor and classify

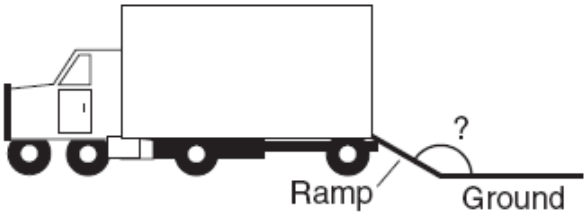
A acute angle, not obtuse

B acute angle

C straight angle

D correct

27 In the diagram below, which is *closest* to the angle measure the moving-van ramp makes with the ground?



A 25°

B 85°

C 150°

D 180°

28 Know straight angle and angles surrounding a point

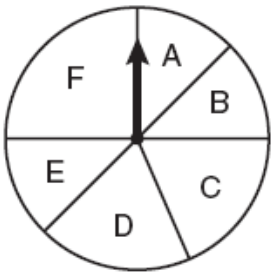
A acute angle

B right angle

C correct

D surrounds a point

29 Raymond played with a game spinner shown below and realized that he could see angles in different sections of the spinner.



The angles in which sections have measures that appear to have a sum of 360 degrees?

A A and B

B E and B

C F, A, and B

D A, B, C, D, E, and F

30 Know straight angle and angles surrounding a point

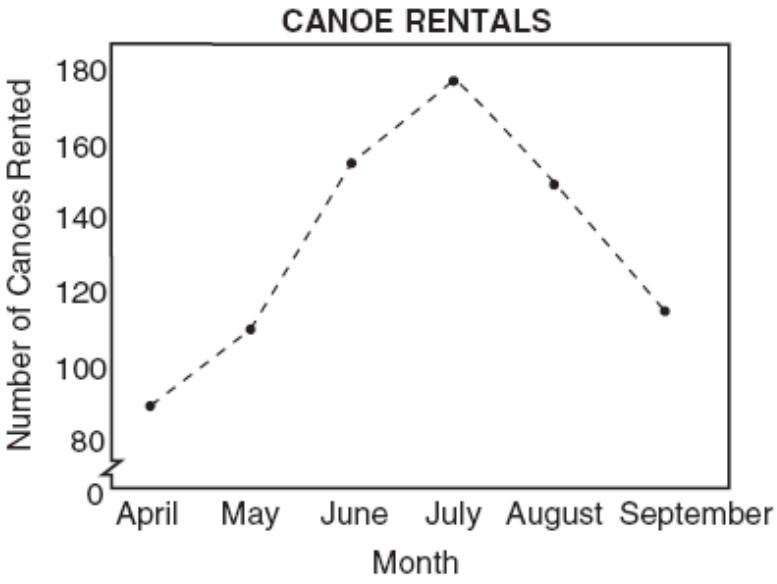
A right angle

B straight angle

C obtuse angle

D correct

31 The owner of Casey's Canoe Rentals graphed the approximate number of canoes rented over six months.



According to the graph, which of the following statements appears to be true?

A The number of canoes rented increased from August to September.

B The same number of canoes was rented in May as in August.

C The number of canoes rented decreased between April and May.

D Two times as many canoes were rented in July as in April.

32 Read and interpret line graphs, and solve problems

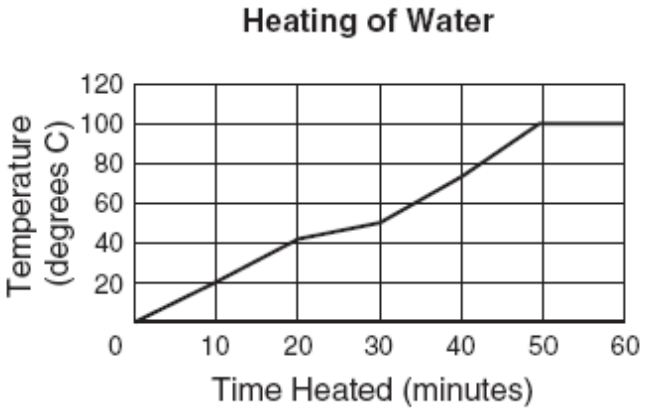
A x-value that corresponds with maximum y-value point

B maximum value on x-axis

C correct

D maximum on value y-axis

33 During science class students were heating water and keeping track of the change in temperature by graphing the temperatures as shown below.



According to the graph, what is true about the temperature of the water?

A The temperature stopped changing between 20 and 30 minutes of heating.

B The temperature changed a total of 120 degrees in the 60 minutes it was heated.

C The temperature stayed the same for 10 minutes out of the 60 minutes it was heated.

D The temperature changed about 60 degrees between 40 and 60 minutes of heating.

PART 3

DIRECTIONS

You will now begin Part 3 of this test. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional sheets may be used.

If you finish early, you may check your work for Part 3 **ONLY**.

Do **NOT** look at items in other parts of this test.

You will have at least 50 minutes to finish Part 3 of this test.

34 Understand percentages as parts out of 100

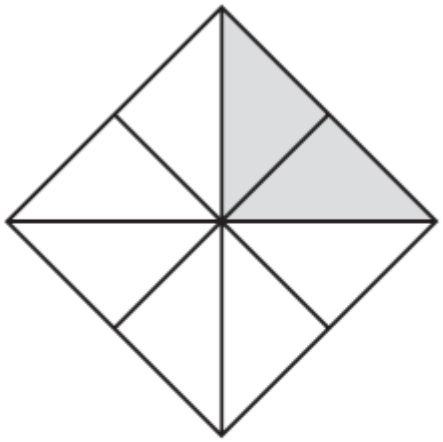
A 1% of complement

B 1% of correct answer

C complement

D correct

35 The figure below is divided into 8 equal-sized sections.



What percent of the figure is shaded?

A 2%

B 4%

C 16%

D 25%

36 Understand percentages as parts out of 100

A face value, not percentage

B correct

C total population

D complement

37 Hernando had $1\frac{1}{4}$ gallons of paint in the shed. He used $\frac{3}{5}$ of a gallon of paint to paint the trim on the house. Which expression represents the total number of gallons of paint remaining?

A $1\frac{1}{4} - \frac{3}{5}$

B $\frac{3}{5} \times 1\frac{1}{4}$

C $\frac{3}{5} \div 1\frac{1}{4}$

D $1\frac{1}{4} + \frac{3}{5}$

38 Write statements involving + and - of fractions

A subtracted instead of added

B correct

C used two wholes instead of one, then incorrect operations

D used two wholes instead of one, then incorrect operations

39 Kurt had a piece of wood that measured $\frac{3}{4}$ foot in length. Kurt needed the length of the wood to be $\frac{1}{6}$ foot shorter. Which expression below is equivalent to the length Kurt needed?

A $\frac{3}{4} + \frac{1}{6}$

B $\frac{3}{4} - \frac{1}{6}$

C $\frac{1}{6} \times \frac{3}{4}$

D $\frac{1}{6} \div \frac{3}{4}$

40 Solve applied problems using fractions & decimals

A added instead of multiplied

B incorrect computation

C correct

D 10 times correct solution

41 Nic bought 11 notebooks for $0.70 each. What was the total cost of the notebooks before tax?

A $ 0.77

B $ 7.70

C $ 8.10

D $11.70

42 Solve applied problems using fractions & decimals

A factor of total

B subtrahend not difference

C correct

D complement

43 Which percent is equivalent to $\frac{2}{10}$?

A 10%

B 12%

C 20%

D 80%

44 Express fractions and decimals as percentages

A numerator as percentage

B complement

C numerator in tens place, denominator in ones place as %

D correct

45 Exactly $\frac{1}{20}$ of the students in Mr. Bank's class have a bird. What percent of his students have a bird?

A 0.05%

B 1%

C 5%

D 20%

46 Know how to use the area formula of a triangle

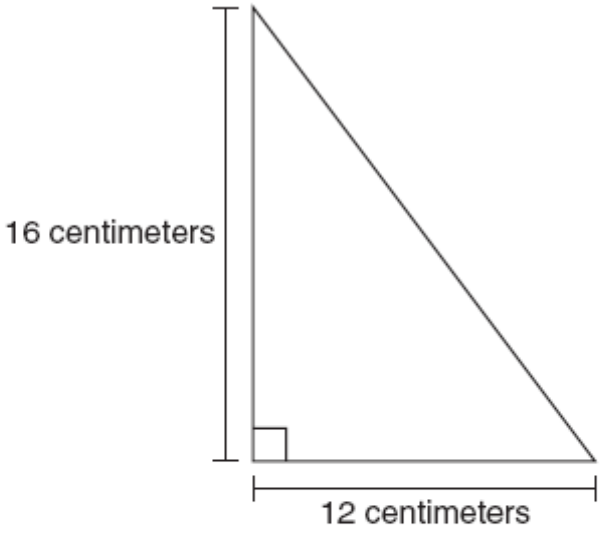
A 1/2(height + base)

B half of area

C height + base

D correct

47 What is the area in square centimeters of the triangle pictured below?



$(A = \frac{1}{2}bh)$

A 28

B 56

C 96

D 192

48 Know how to use the area formula of a triangle

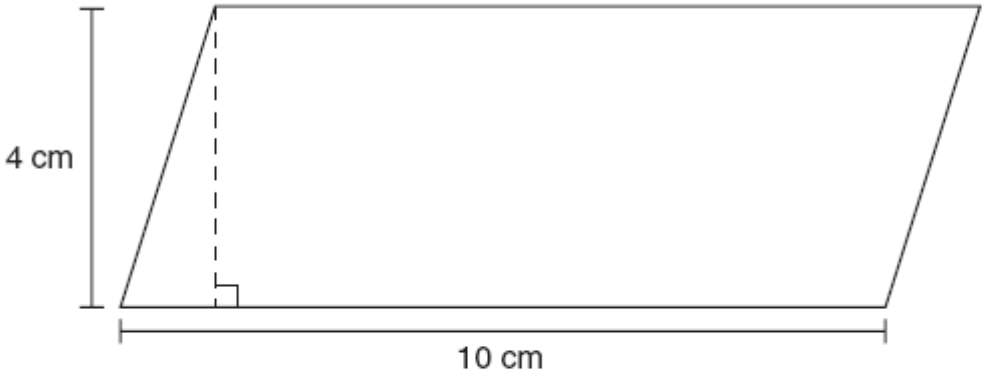
A height + base

B half of area

C correct

D twice the area

49 What is the area of the parallelogram shown below?



(Area = base × height)

A 14 cm^2

B 20 cm^2

C 28 cm^2

D 40 cm^2

50 Know how to use area formula for a parallelogram

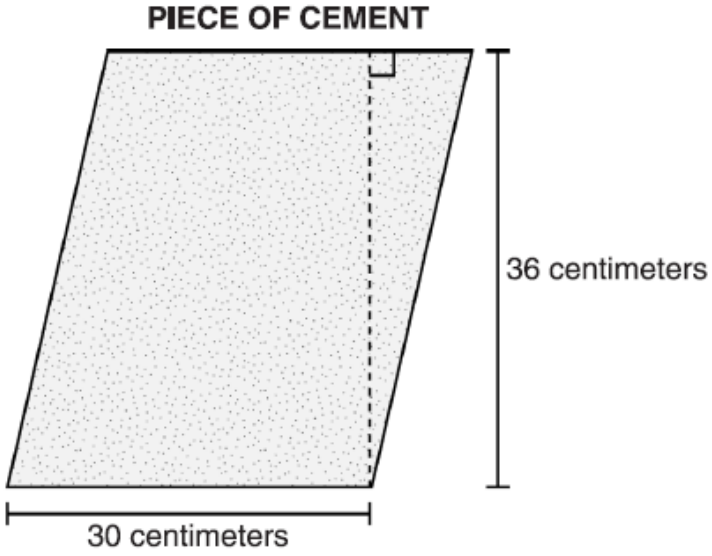
A correct

B half of area

C measure of perimeter

D half of measure of perimeter

51 Allison is making a path in her backyard with pieces of cement that are parallelogram-shaped, as pictured below.



(Area = base × height)

What is the area of the parallelogram-shaped piece of cement?

A 66 square centimeters

B 132 square centimeters

C 540 square centimeters

D 1,080 square centimeters

52 Know interior angles of a triangle & quadrilateral

A total number of degrees in quadrilateral

B correct

C number of degrees in opposite angle

D complementary angle to one of adjacent angles

53 Which of the following could be the measures of the interior angles of a triangle?

A 30°, 30°, 30°

B 30°, 60°, 90°

C 60°, 90°, 120°

D 60°, 120°, 180°

54 Know interior angles of a triangle & quadrilateral

A sum of two interior angles of triangle

B right angle

C correct

D difference of two interior angles of triangle

55 The set of data below represents the number of books read in one month by each member of the book club.

3, 6, 7, 3, 3, 9, 0, 0, 1, 3, 7, 2, 5, 9, 7

What is the mode number of books for this set of data?

A 0

B 3

C 7

D 9

56 Given set of data, find & interpret mean, mode

A mode

B median

C correct

D maximum

57 The data below show a set of Angela's golf scores. What is the mean of the scores listed?

84 88 88 77 73

A 73

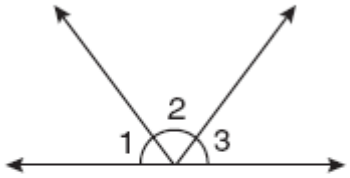
B 82

C 84

D 88

58 Item not scored for Fall 2007

59 What appears to be the total degree measurement of angles 1, 2, and 3 in the diagram shown below?



A 90°

B 180°

C 270°

D 360°

60 Know the units of measure of volume

A unit of length

B unit of length

C correct

D unit of area

61 Sarah has a box that measures 1 foot on each side. How many 1-inch cubes will fill the box?

A 36

B 144

C 432

D 1,728

62 Express ratios in the forms a to b, a:b, a/b

A impossibility

B reversed (b to a, instead of a to b)

C reversed

D correct

63 Mrs. Taylor has a total of 28 students in her class. She would like to create 7 groups with an equal number of students in each group. Which expression represents the number of students Mrs. Taylor should put in each group?

A $7 \div 28$

B $28 \div 7$

C $28 - 7$

D 7×28

64 Multiply a whole number by powers of 10, identify patterns

A 1/10 the solution

B correct

C 10 times the solution

D 100 times the solution

65 Multiply 26×6.8

A 142.8

B 176.8

C 238.0

D 364.0

66 Solve multi-step problems involving means

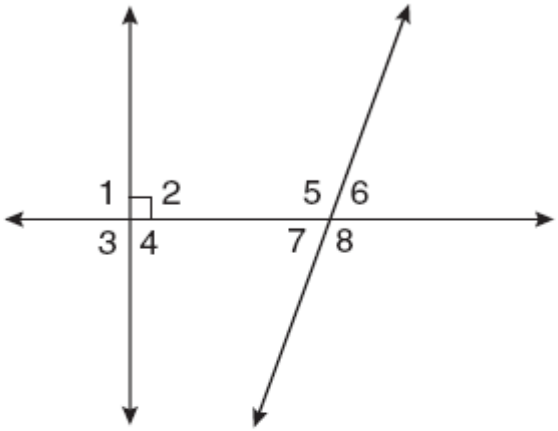
A correct

B lowest mean score

C highest single score

D not highest mean score

67 In the diagram below, three lines intersect to form the angles shown.



Which of the two angles below are vertical angles?

A 1 and 6

B 2 and 7

C 3 and 4

D 5 and 8

68 Find unknown angles in problems

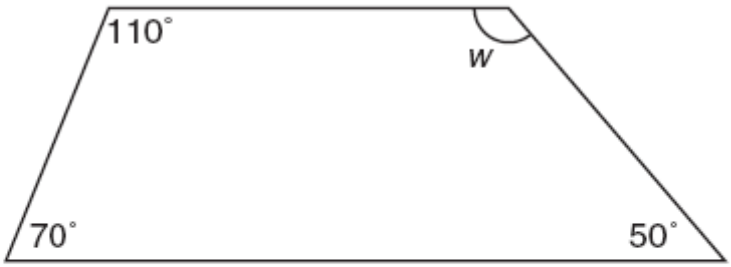
A given angle

B complementary, not supplementary

C correct

D straight line

69 What is the value of *w* in the trapezoid shown below?



A 40°

B 70°

C 110°

D 130°

70 Solve volume problems of rectangular prisms

A two of three correct dimensions – too small

B two of three correct dimensions – too large

C correct

D two of three correct dimensions – too large

71 What number goes in the blank to make the statement below true? 1 liter = 1,000 milliliters

30,000 milliliters = _____ liters

A 0.3

B 3

C 30

D 300

72 Add and subtract fractions with unlike denominators

A added numerators, multiplied denominators

B multiplied numerators, added denominators

C added numerators, added denominators

D correct

73 Which statement means the same as $\frac{3}{8}$?

A 3 minus 8

B 8 divided by 3

C 3 divided by 8

D 3 multiplied by 8

74 Compare two fractions using common denominators

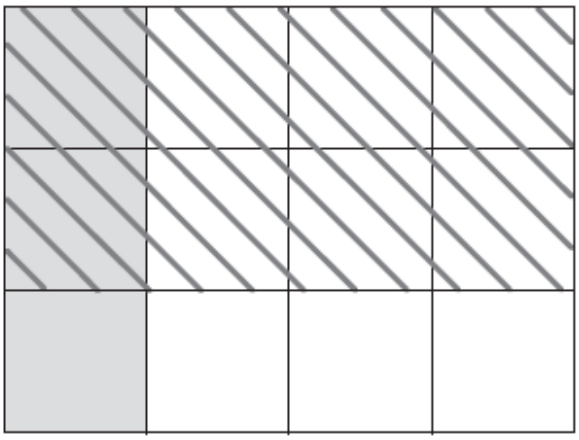
A half of given fraction

B correct

C multiplied numerator, denominator by different numbers

D added same number to numerator and denominator

75 The rectangular diagram below represents 1 whole.



Which multiplication expression represents the value of the sections that are both shaded and striped?

A $\frac{3}{12} \times \frac{6}{12}$

B $\frac{1}{3} \times \frac{2}{3}$

C $\frac{1}{12} \times \frac{3}{12}$

D $\frac{1}{4} \times \frac{2}{3}$

76 Find prime factorization of #s, show exponentially

A correct

B factorization contains composite number

C factorization contains composite number

D factorization contains composite number

77 Divide $\frac{1}{3} \div 5$

A $\frac{1}{15}$

B $\frac{3}{5}$

C $\frac{5}{3}$

D $\frac{15}{1}$

78 Solve contextual problems involving +/- fractions

A added numerators, added denominators

B one of addends

C correct

D incorrect addition

79 What value for p makes the equation below true?

$$\frac{1}{3} + p = \frac{5}{12}$$

A $\frac{1}{12}$

B $\frac{4}{12}$

C $\frac{4}{9}$

D $\frac{3}{4}$

Scoring Key: Part 1

Item No.	Correct Answer	GLCE	Type	Description
1	A	N.FL.05.04	Core-NC	Multiply a multi-digit number by a two-digit number
2	C	N.FL.05.04	Core-NC	Multiply a multi-digit number by a two-digit number
3	C	N.FL.05.04	Core-NC	Multiply a multi-digit number by a two-digit number
4	B	N.FL.05.06	Core-NC	Divide up to a 4-digit number by a two-digit number
5	A	N.FL.05.06	Core-NC	Divide up to a 4-digit number by a two-digit number
6	B	N.FL.05.06	Core-NC	Divide up to a 4-digit number by a two-digit number
7	A	N.ME.05.08	Core-NC	Understand the relative magnitude base-10 system
8	A	N.ME.05.08	Core-NC	Understand the relative magnitude base-10 system
9	C	N.ME.05.08	Core-NC	Understand the relative magnitude base-10 system
10	B	M.UN.05.04	Core-NC	Convert measurements within a given system
11	B	M.UN.05.04	Core-NC	Convert measurements within a given system
12	A	M.UN.05.04	Core-NC	Convert measurements within a given system

NC=Non Calculator

Scoring Key: Part 2

Item No.	Correct Answer	GLCE	Type	Description
13	B	N.MR.05.01	Core	Understand the meaning of division of whole numbers
14	A	N.MR.05.01	Core	Understand the meaning of division of whole numbers
15	B	N.MR.05.01	Core	Understand the meaning of division of whole numbers
16	A	N.MR.05.02	Core	Know division of whole numbers in form a = bq + r
17	B	N.MR.05.02	Core	Know division of whole numbers in form a = bq + r
18	B	N.MR.05.02	Core	Know division of whole numbers in form a = bq + r
19	A	N.FL.05.05	Core	Solve problems involving x and ÷ of whole numbers
20	D	N.FL.05.05	Core	Solve problems involving x and ÷ of whole numbers
21	C	N.FL.05.05	Core	Solve problems involving x and ÷ of whole numbers
22	B	M.PS.05.05	Core	Show relationships between areas of polygons
23	B	M.PS.05.05	Core	Show relationships between areas of polygons
24	D	M.PS.05.05	Core	Show relationships between areas of polygons
25	B	G.GS.05.02	Core	Measure angles with a protractor and classify
26	D	G.GS.05.02	Core	Measure angles with a protractor and classify
27	C	G.GS.05.02	Core	Measure angles with a protractor and classify
28	C	G.GS.05.05	Core	Know straight angle and angles surrounding a point
29	D	G.GS.05.05	Core	Know straight angle and angles surrounding a point
30	D	G.GS.05.05	Core	Know straight angle and angles surrounding a point
31	D	D.RE.05.01	Core	Read and interpret line graphs, and solve problems
32	C	D.RE.05.01	Core	Read and interpret line graphs, and solve problems
33	C	D.RE.05.01	Core	Read and interpret line graphs, and solve problems

Scoring Key: Part 3

Item No.	Correct Answer	GLCE	Type	Description
34	D	N.ME.05.09	Core	Understand percentages as parts out of 100
35	D	N.ME.05.09	Core	Understand percentages as parts out of 100
36	B	N.ME.05.09	Core	Understand percentages as parts out of 100
37	A	N.FL.05.18	Core	Write statements involving + and - of fractions
38	B	N.FL.05.18	Core	Write statements involving + and - of fractions
39	B	N.FL.05.18	Core	Write statements involving + and - of fractions
40	C	N.FL.05.20	Core	Solve applied problems using fractions & decimals
41	B	N.FL.05.20	Core	Solve applied problems using fractions & decimals
42	C	N.FL.05.20	Core	Solve applied problems using fractions & decimals
43	C	N.MR.05.22	Core	Express fractions and decimals as percentages
44	D	N.MR.05.22	Core	Express fractions and decimals as percentages
45	C	N.MR.05.22	Core	Express fractions and decimals as percentages
46	D	M.TE.05.06	Core	Know how to use the area formula of a triangle
47	C	M.TE.05.06	Core	Know how to use the area formula of a triangle
48	C	M.TE.05.06	Core	Know how to use the area formula of a triangle
49	D	M.TE.05.07	Core	Know how to use area formula for a parallelogram
50	A	M.TE.05.07	Core	Know how to use area formula for a parallelogram
51	D	M.TE.05.07	Core	Know how to use area formula for a parallelogram
52	B	G.GS.05.06	Core	Know interior angles of a triangle & quadrilateral
53	B	G.GS.05.06	Core	Know interior angles of a triangle & quadrilateral
54	C	G.GS.05.06	Core	Know interior angles of a triangle & quadrilateral
55	B	D.AN.05.03	Core	Given set of data, find & interpret mean, mode
56	C	D.AN.05.03	Core	Given set of data, find & interpret mean, mode

Scoring Key: Part 3 (continued)

Item No.	Correct Answer	GLCE	Type	Description
57	B	D.AN.05.03	Core	Given set of data, find & interpret mean, mode
58	CR			
59	B	G.TR.05.01	Extended Core	Know that angles are measured in degrees
60	C	M.UN.05.02	Extended Core	Know the units of measure of volume
61	D	M.UN.05.03	Extended Core	Compare relative sizes of cubic measures
62	D	N.ME.05.23	Extended Core	Express ratios in the forms a to b, a:b, a/b
63	B	N.MR.05.03	Extended Core	Write mathematical statements involving division
64	B	N.MR.05.15	Extended Core-NC	x a whole number by powers of 10, identify patterns
65	B	N.MR.05.17	Extended Core-NC	Multiply decimals to 100ths by whole numbers
66	A	D.AN.05.04	Future Core	Solve multi-step problems involving means
67	D	G.GS.05.03	Future Core	Identify angles on a straight line & vertical angles
68	C	G.GS.05.04	Future Core	Find unknown angles in problems
69	D	G.GS.05.07	Future Core	Find unknowns using properties of triangles, quads.
70	C	M.PS.05.10	Future Core	Solve volume problems of rectangular prisms
71	C	M.UN.05.01	Future Core	Know equivalence of 1 liter, 1000 ml and 1000 cc
72	D	N.FL.05.14	Future Core	Add and subtract fractions with unlike denominators
73	C	N.ME.05.10	Future Core	Understand & show fractions as a statement of ÷
74	B	N.ME.05.11	Future Core	Compare two fractions using common denominators
75	D	N.ME.05.12	Future Core-NC	Multiply two unit fractions using area model
76	A	N.MR.05.07	Future Core	Find prime factorization of #s, show exponentially
77	A	N.MR.05.13	Future Core-NC	Divide using fractions and whole numbers
78	C	N.MR.05.19	Future Core	Solve contextual problems involving +/- fractions
79	A	N.MR.05.21	Future Core	Solve for the unknown in equations with fractions